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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,431	03/16/2004	David Alan Johnson	5	3091

7590 03/22/2005
David A. Johnson
7945 Ruststone Ct.
Colorado Springs, CO 80919

EXAMINER

FENTY, JESSE A

ART UNIT PAPER NUMBER

2815

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/801,431

Applicant(s)

JOHNSON ET AL.

Examiner

Jesse A. Fenty

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 4 and 5 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

a. In re claims 4 and 5, the specification does not disclose "over-layers of other semiconductors specific to the devices fabricated."

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Deshpande et al. (US 2004/0242010 A1).

In re claim 1, Deshpande (esp. Fig. 3E) discloses a structure providing anneal cap, ion implant mask (68), and shallow trench isolation (70) features for III-V devices comprising a trench etched into the semiconductor, a combination anneal cap/CMP stop layer, and a dielectric trench fill layer, with significant topography reduction compared to the traditional dielectric structure.

In re claims 2, Deshpande discloses the device of claim 1, wherein said III-V semiconductor is GaAs (section [0038]).

In re claims 3, Deshpande discloses the device of claim 1, wherein said III-V semiconductor is InP (section [0038]).

In re claim 4, as best understood, Deshpande discloses the device of claim 1, wherein said III-V semiconductor is GaAs with over-layers of other semiconductors specific to the devices fabricated¹.

¹ As described in sections [0069 - 0071], the device will be used in combination with various PFET and NFET devices, which will comprise over-layers of semiconductor, such as a gate polysilicon layer, as is well known in the art.

In re claim 5, as best understood, Deshpande discloses the device of claim 1, wherein said III-V semiconductor is InP with over-layers of other semiconductors specific to the devices fabricated².

In re claim 8, Deshpande discloses the device of claim 1, wherein said dielectric trench fill layer is silicon dioxide (section [0061]).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deshpande et al. as applied to claim 1 above, and further in view of Ohta (US 2004/0126990 A1).

In re claim 6, Deshpande discloses the device of claim 1, but does not expressly disclose the silicon nitride layer being in the range of 100 to 3000 angstroms. Ohta discloses a silicon nitride liner having a thickness of 20 to 40 nm, which equates to 200 to 400 angstroms. It would have been obvious for one skilled in the art at the time of the invention to use a thicker liner layer as disclosed by Ohta for the device of Deshpande for the purpose, for example, of enhancing FET characteristics, such as increased drain current, by generating greater tensile stress in the silicon nitride layer (Ohta; sections [0032, 0045, 0056]).

² As described in sections [0069 - 0071], the device will be used in combination with various PFET and NFET devices, which will comprise over-layers of semiconductor, such as a gate polysilicon layer, as is well known in the art.

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In re claim 7, Deshpande discloses the device of claim 1,. Ohta discloses a silicon nitride liner having a thickness of 20 to 40 nm, which equates to 2 to 4 percent of the trench depth. Deshpande discloses the claimed invention wherein the trench depth is in the range of 1 μ m (1000nm), section [0047], but does not expressly disclose the silicon nitride layer having a thickness of 5 to 25 percent of the trench depth. It would have been obvious to one having ordinary skill in the art at the time the invention was made to increase the thickness of the nitride liner since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. To do so would improve the FET characteristics, such as drain current, as disclosed by Ohta (sections [0032, 0045, 0056]).

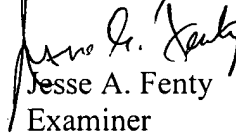
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 571-272-1729. The examiner can normally be reached on 5/4-9 1st Fri. Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jesse A. Fenty
Examiner
Art Unit 2815